MULTI-SOURCE SATELLITE DATA FUSION IN MONSOON AREAS FOR AGRICULTURAL APPLICATION

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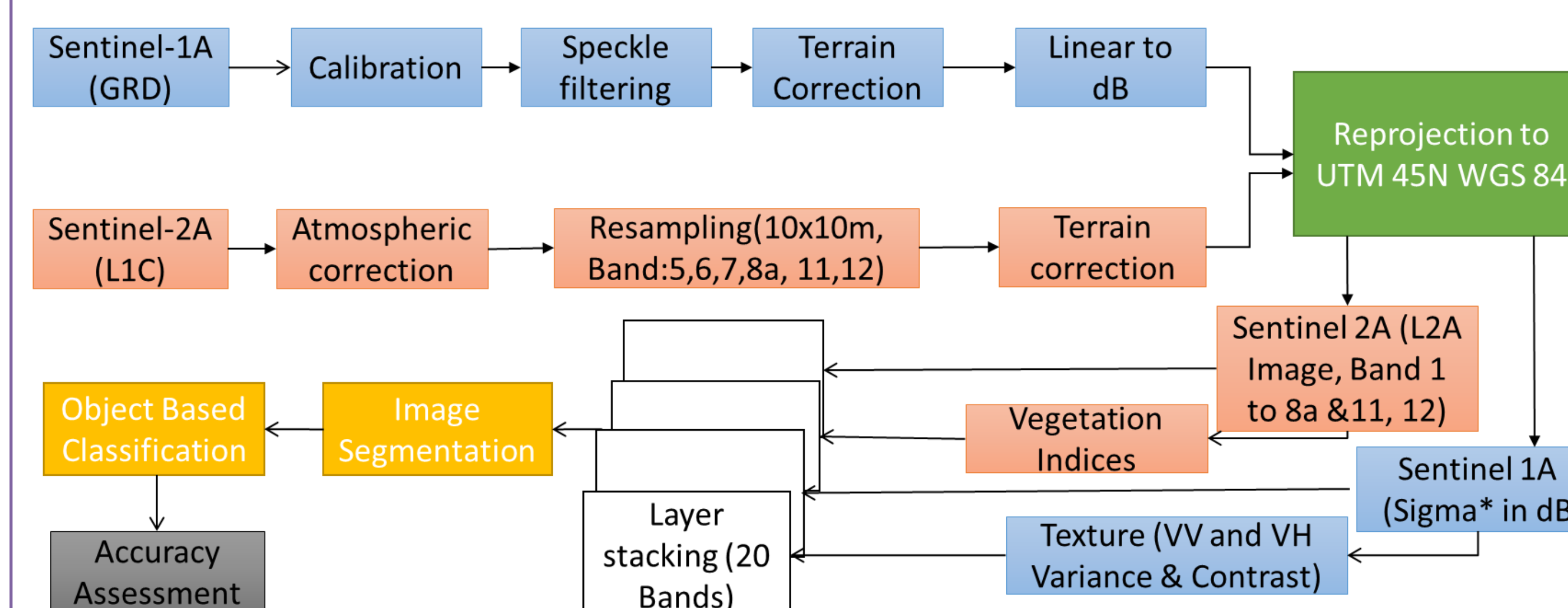[2]Indian Institute of Technology Kharagpur, India

Objective

Updated farm typologies and agricultural production systems dynamics are key requisite for successful agricultural diversification and intensification. There are several methods and approaches have been in application for mapping land use and land cover dynamics, however, often challenged with the monsoon climatic conditions, especially cloud cover, granularity, and complex cropping systems.

the main objective of this study to integrate Sentinel-1A and Sentinel-2A data for accurate agricultural area mapping by integrating the advantages of radar and optical imagery, using object based classification.

Study area

Odisha is a major agricultural state of India. The cropped area is about 87.46 lakh hectares out of which 18.79 lakh hectares are irrigated and the area under agriculture is comparatively more in the coastal districts. The area has been taken two district of Odisha Bhadrak and Kendrapara.

Study Area

Districts: Bhadrak & Kendrapara
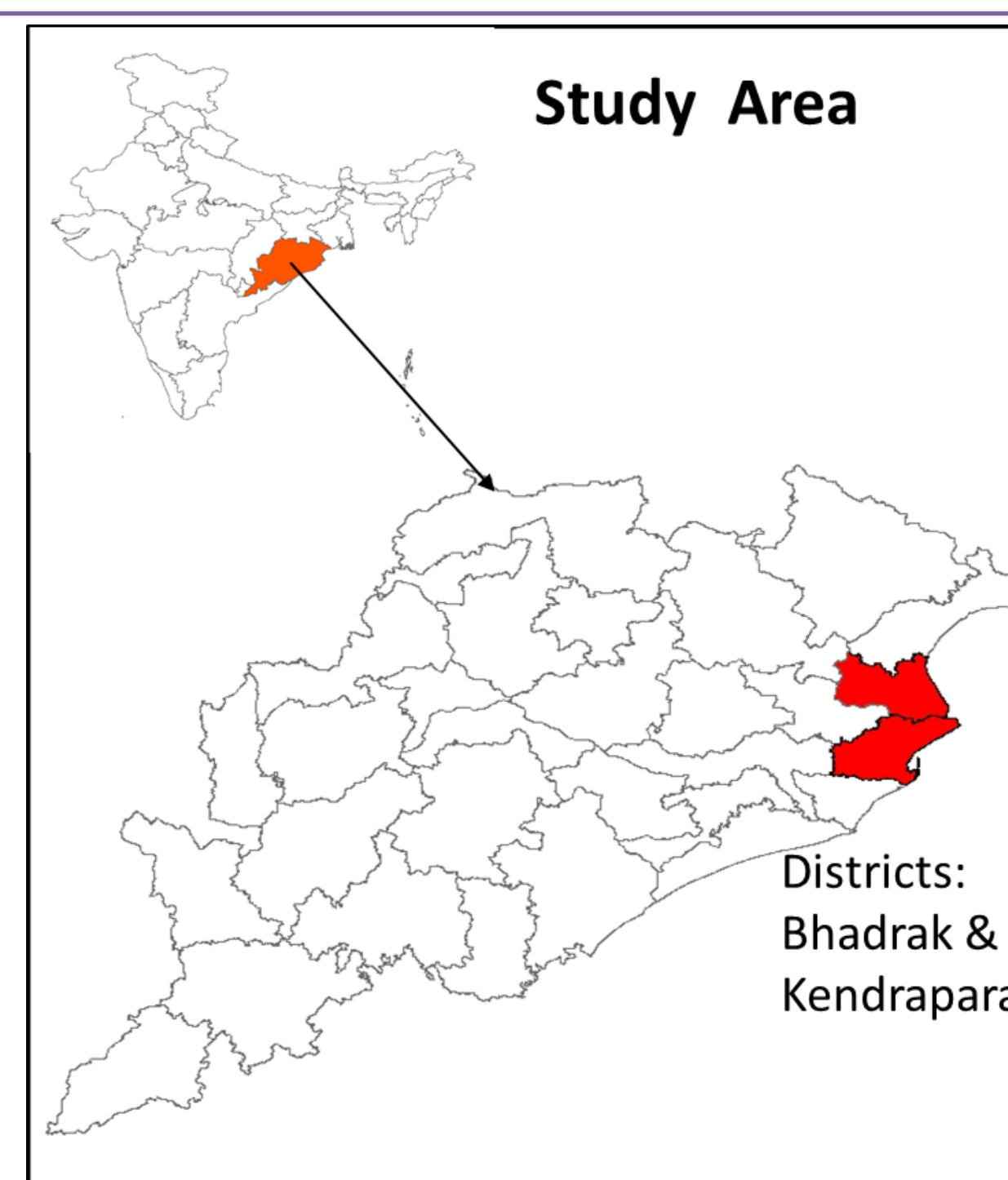
Data Used

Sentinel-2 (10 bands)
Vegetation indices- NDVI, GNDVI, NDWI and S2REP(4)
Sentinel-1 Sigma* -VV and VH (2)
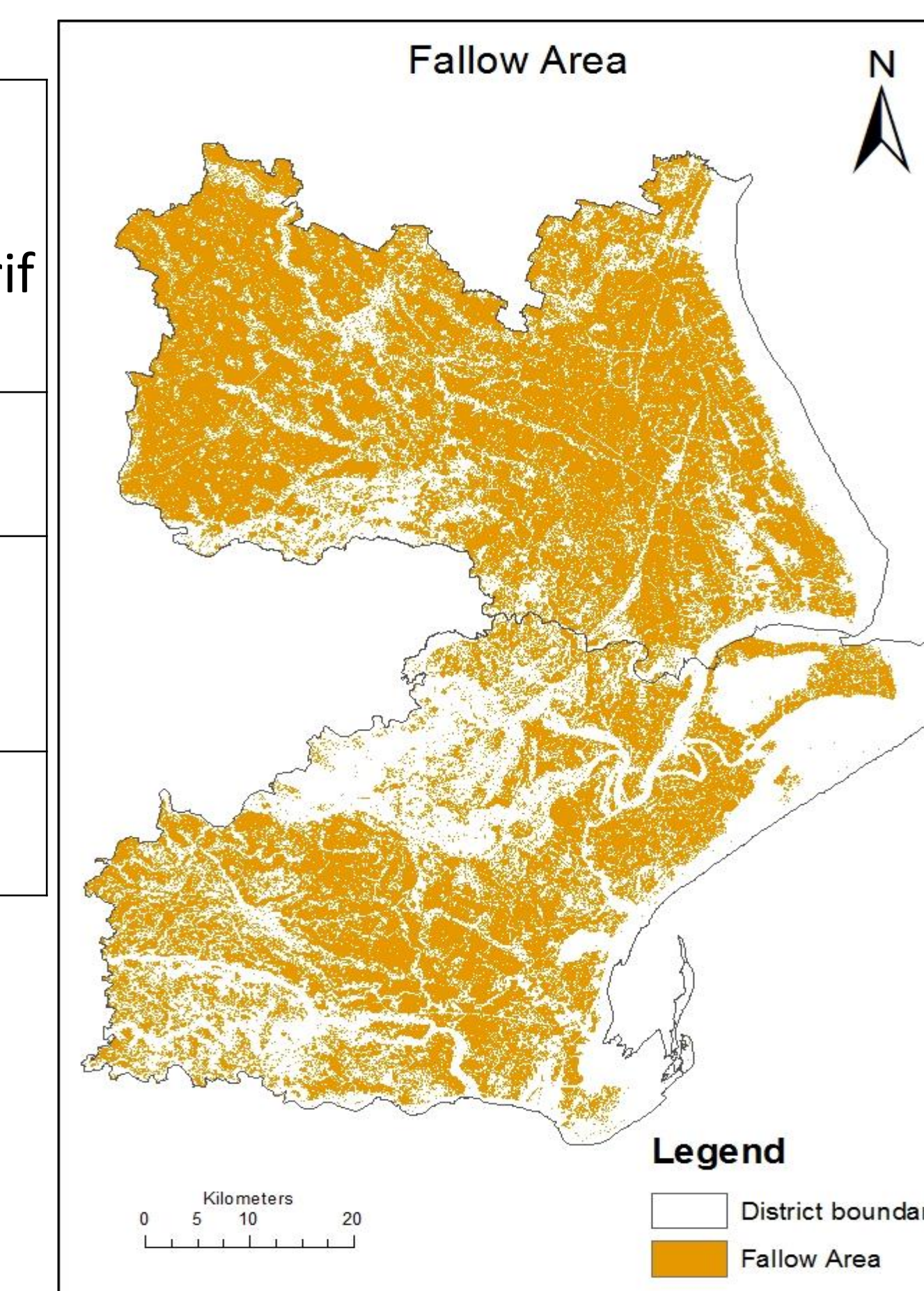**Texture:** Contrast &Variance(4)

Methodology

The methodology is divided into four steps:
1. Pre-processing of the Sentinel products using the Sentinel Toolboxes, integrated in the Sentinel Application Platform (SNAP).
2. Selection of the Sentinel data and their derived products:
3. Segmentation and Classification using eCognition
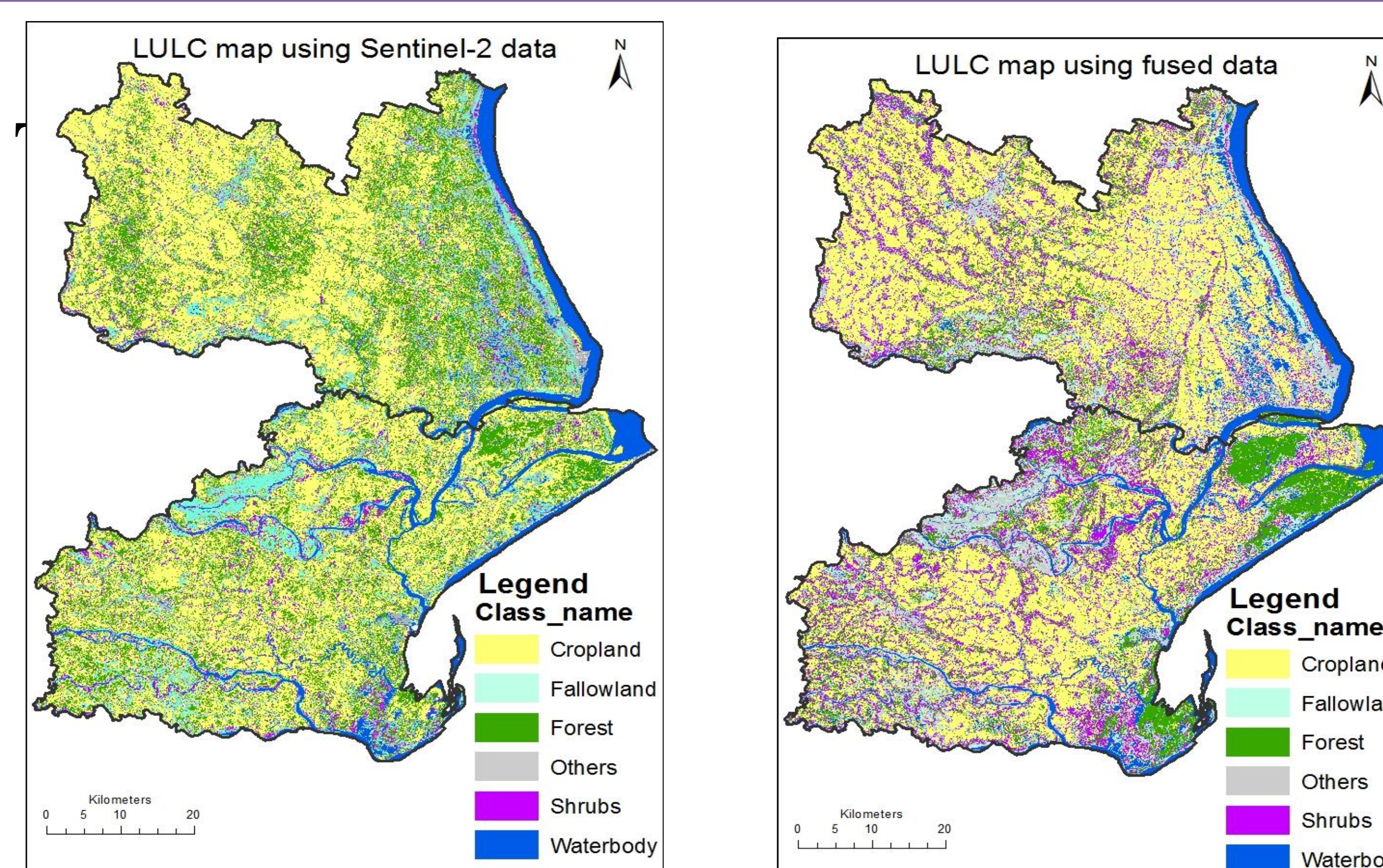4. Accuracy assessment

Results and Discussion

LULC map using Sentinel-2 data

LULC map using fused data

Legend Class_name: Cropland, Fallowland, Forest, Others, Shrubs, Waterbody

The results have shown that high classification accuracies were achieved using fused data. Overall accuracy of the classification of sentinel-2 and fused was 84.6% and 89.5%, respectively.

Results and Discussion contd.

District	Kharif Rice + Rabi Crop	Post Kharif Rice Fallow Areas	Post kharif rice fallows as % of kharif rice area
Bhadrak	154613	122870	79 %
Kendraparha	130510	57247	43 %
Total (ha)	**104987**	**180117**	

Fallow Area

Legend: District boundary, Fallow Area

1. The high spatial and temporal resolution of the Sentinel data in the same constellation and processing chain has open tremendous opportunities in quantification of crop land, crop fallows at near-real time for agricultural diversification and intensification .
2. It is comparatively accurate method to estimate fallow area for crop intensification.